

REMARKS

Claims 1 through 15 are presented for examination. Claim 1 has been amended to define still more clearly what Applicant regards as his invention, in terms which distinguish over the art of record. Claim 1 is the only independent claim.

Claims 1 through 9 have been rejected under 35 U.S.C. § 102(b) as anticipated by U.S. Patent 5,122,903 (Aoyama et al.). Claims 10 through 15 have been rejected under 35 U.S.C. § 103(a) as unpatentable over Aoyama et al. in view of European Patent EP 821258 (Yajima). With regard to the claims as currently amended, these rejections are respectfully traversed.

Independent Claim 1 as currently amended is directed to a diffractive optical element in which a grating structure has a first blazed type grating portion and a second blazed type grating portion arranged on a light exit side of the first blazed type grating portion. In at least one of the first and second blazed type grating portions, structures smaller than a used wavelength are arranged in a periodic manner.

In Applicant's view, Aoyama et al. discloses an optical element with a substrate and a composite grating pattern formed thereon. The pattern is constituted with two different kinds of grating patterns superimposed on the substrate. When one of the two kinds of grating patterns is formed in a Fresnel lens pattern, a light focusing or collimating function (i.e. a lens function) is implemented. When the other pattern is formed in an equally separated linear grating pattern, the optical element develops the lens function and functions to diffract lights through the linear grating. When one of the two kinds of grating patterns is formed in a Fresnel lens pattern and the other pattern is implemented in an unequally separated linear grating pattern, a lens function to focus lights onto a point and a

cylindrical lens function to focus lights in a linear contour are obtained. Consequently, when parallel lights are incident to the optical element, there occurs astigmatism.

According to the invention defined in Claim 1 as currently amended, a second blazed type grating portion of a grating structure is arranged on the light exit side of a first blazed type grating portion and, in at least one of the blazed type grating portions, structures smaller than a used wavelength are arranged in a periodic manner.

Aoyama et al. may teach an optical element that has both a Fresnel lens (21, 31) and a grating (22, 32). As clearly shown in Figs. 6 of Aoyama et al., the thickness of the grating 22 is modulated by the thickness of the Fresnel lens 21 and as disclosed with respect to Fig. 9 of Aoyama et al. at lines 15 to 21 of column 6,

"In this configuration, a high-density linear grating 32 with a period ranging from a wavelength λ to half the wavelength $\lambda/2$ of an incident light is superimposed on to a Fresnel lens pattern 31 (in which the thickness of the linear grating 32 is modulated by the thickness of the Fresnel lens pattern 31) so as to form a composite grating pattern on a substrate 30."

In contrast to Aoyama et al.'s composite grating patterns in which the thickness of a linear grating is modulated by the thickness of a Fresnel lens pattern to form a composite, it is a feature of Claim 1 that the second blazed type grating portion is arranged on the light exit side of the first blazed grating portion. As a result, it is not seen that Aoyama et al.'s arrangement of a Fresnel lens and a grating that are overlapped with one grating modulating the other grating could possibly teach or suggest a grating structure in which a second blazed grating portion is arranged at the exit side of a first blazed grating portion as in Claim 1.

arg #1

It is also a feature of Claim 1 that the grating structure has a first blazed type grating portion and a second blazed grating portion. Aoyama et al. may teach a structure having a Fresnel lens pattern (21, 31) which is a blazed grating. The other grating (22, 32) of the Aoyama et al. structure, however, is not a blazed grating. As a result, Aoyama et al. is restricted to teaching a grating structure that is provided with only one blazed grating portion. It is therefore not seen that Aoyama et al. in any manner teaches or suggests a grating structure having two blazed type grating portions with one blazed type grating portion at the exit side of the other blazed type grating portion as in Claim 1. It is therefore believed that Claim 1 as currently amended, is completely distinguished from Aoyama et al. and is allowable.

#2

A review of the other art of record has failed to reveal anything which, in Applicant's opinion, would remedy the deficiencies of the art discussed above, as references against the independent claim herein. That claim is therefore believed patentable over the art of record. Applicants submit that the amendments to independent Claim 1 clarify Applicant's invention and serve to reduce any issues for appeal.

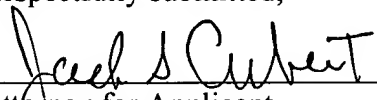
The other claims in this application are each dependent from the independent claim discussed above and are therefore believed patentable for the same reasons. Since each dependent claim is also deemed to define an additional aspect of the invention, however, the individual reconsideration, of the patentability of each on its own merits is respectfully requested.

In view of the foregoing amendments and remarks, Applicant respectfully requests favorable reconsideration and early passage to issue of the present application.

The Examiner is respectfully requested to enter this Amendment After Final Action under 37 C.F.R. § 1.116.

Applicant's attorney, Scott D. Malpede, may be reached in our Washington, D.C. office by telephone at (202) 530-1010. All correspondence should be directed to our address listed below.

Respectfully submitted,



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